

8. (Amended) A credit card, said credit card comprising:
coded information unique to a card holder presented to a business for a sales transaction without presenting personal information of said card holder to the business, said coded information decoded by a credit card verification device comprising a zero-knowledge verification unit based on a zero-knowledge verification system possessed by said business and goods or services supplied by said business to said card holder.

REMARKS

Applicant has filed the present Amendment in reply to the outstanding Official Action of June 19, 2002, and Applicant further believes the Amendment to be fully responsive to the Official Action for reasons set forth below in greater detail.

In the present Official Action, the Examiner rejected Claims 1 and 3 pursuant to 35 U.S.C. §112, second paragraph, as allegedly indefinite. The Examiner further rejected Claims 1-8 pursuant to 35 U.S.C. §102(b), as allegedly anticipated by Low, *et al.* (U.S. Patent No. 5,420,926) (hereinafter "Low"). More particularly, the Examiner alleged that Low's technique for "anonymous" credit card transactions discloses the claimed sales system utilizing a "zero-knowledge" verification system. Finally, the Examiner rejected Claims 1-8 pursuant to 35 U.S.C. §103(a), as allegedly unpatentable over a combination of Low in view of Goldwasser, *et al.* (U.S. Patent No. 4,926,479) (hereinafter "Goldwasser"). More particularly, the Examiner alleged that although Low may perhaps not be considered a zero-knowledge system, Goldwasser teaches a zero-knowledge system that may be used with credit cards and it would be obvious to one skilled in the art to combine Goldwasser and Low to accomplish the purposes of Low's anonymous credit card system.

At the outset and before addressing the particular rejections raised in the present Official Action, Applicant has amended independent Claims 1, 4 and 8 to clarify that the sales system according to the present invention comprises: 1) a credit card containing coded information unique to the card holder; 2) a credit card verification device possessed by the business, the credit card verification device comprising a zero-

knowledge verification unit based on a zero-knowledge verification system for verifying the credit card containing coded information based on the zero-knowledge verification system; and 3) a sales transaction in which the cardholder presents the coded information of the credit card to the business without presenting personal information of the card holder to the business and the business after verifying the credit card using the credit card verification device supplies goods or services to the card holder. More specifically, Applicant has explicitly recited a sales transaction, which requires only a credit card and a credit card verification device, where upon verification of the credit card goods or services are supplied. Support for the amendments are found in the present specification on page 8, lines 12-17 and page 9, lines 9-14. Applicant respectfully submits that no new information has been added by the amendments.

Regarding the rejection of Claim 1 pursuant to 35 U.S.C. §112, second paragraph, Applicant has further amended Claim 1 by deleting "said," to thereby provide antecedent basis for the term "personal information." Regarding the rejection of Claim 3 pursuant to 35 U.S.C. §112, second paragraph, Applicant has amended Claim 3 to clarify that the card company (as well as the business) possesses a credit card verification device comprising a zero-knowledge verification unit based on zero-knowledge verification system and being capable of verifying the credit card. Support for the amendment is found in the present specification at page 5, lines 10-12 and 19-22 in view of Figure 1, reference no. 5.

Consequently, Applicant respectfully requests the Examiner to withdraw the rejections of Claims 1 and 3 pursuant to 35 U.S.C. §112, second paragraph.

Regarding the rejections of Claims 1-8 pursuant to 35 U.S.C. §§102(b) and 103(a), Applicant respectfully disagrees with the Examiner's allegations and consequently proffers the following arguments in support of patentability of Claims 1-8 over either the primary reference to Low or the Low-Goldwasser combination.

Insofar as rejections pursuant to 35 U.S.C. §102(b) are concerned, it is axiomatic that anticipation pursuant to §102(b) requires that the prior art reference disclose each and every element of the claim to which it is applied. In re King, 801 F.2d 1324, 1326 (Fed. Cir. 1986). Thus, there must be no differences between the subject matter of the claim and the disclosure of the applied prior art reference. Stated another

way, the prior art reference must contain within its four corners adequate direction to practice the invention as claimed. A corollary to the aforementioned rule, which is equally applicable, states that the absence from the applied prior art reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 1571 (Fed. Cir. 1986).

In traversing the rejections of Claims 1-8 pursuant to 35 U.S.C. §102(b), Applicant respectfully submits that the primary reference to Low is defective in that it fails to disclose a sales system (credit card verification device of Claim 4 and credit card of Claim 8) comprising: 1) a credit card containing coded information unique to the card holder; 2) a credit card verification device possessed by the business, the credit card verification device comprising a zero-knowledge verification unit based on a zero-knowledge verification system for verifying the credit card containing coded information based on the zero-knowledge verification system; and 3) a sales transaction in which the cardholder presents the coded information of the credit card to the business without presenting personal information of the card holder to the business and the business after verifying the credit card using the credit card verification device supplies goods or services to the card holder. These underlined fundamental distinctions will be addressed below.

Applicant first respectfully submits Low does not disclose the explicitly recited sales transaction, which requires only a credit card and a credit card verification device, where upon verification of the credit card goods or services are supplied to a card holder. Applicant respectfully submits that contrary to the present invention, Low's transaction requires the approval by an intermediate third party (See Low Col. 3, lines 19-20; and Col. 8, lines 53-58). More specifically, in order for Low's transaction to take place, it is necessary to obtain the approval of the bank B_p (See Low Col. 5, lines 31-33) that is not the same as the bank B_c that issues the credit card, and the funds are transferred to an account at bank B_s (which may differ from both banks B_p and B_c) before the merchandise is released to the customer P (See Low, Col. 3, lines 32-37). Furthermore, Low's transfer results directly from a request made by the customer P to the bank B_p (See Col. 3, lines 32-35 and column 5, lines 9-11). Consequently, Low requires the following: 1) customer P must have accounts with at least two banks; 2) customer P must contact

one of the banks to initiate a purchase transaction; 3) a bank's approval is required before the customer P receives the merchandise or service the customer wishes to purchase; and 4) funds must be transferred to an account at a bank before the merchandise is released to the customer.

In contrast to Low, the sales system of the present invention requires only that a card holder present the credit card to the business for a sales transaction, the business confirms the validity of the credit card and supplies the goods to the cardholder. This is a fundamental difference between Low and the present invention. Contrary to Low's requirements, in the present invention: 1) the card holder need only maintain one account (not two accounts), i.e., the account with the credit card company; 2) the card holder need not contact a bank or card company to initiate the purchase transaction, i.e., supplying the credit card to the business is all that is necessary; 3) the card holder need not obtain approval for the purchase transaction by a third party (i.e., bank); and 4) and the funds do not have to be transferred to the business before the business will supply the merchandise to the card holder.

Applicant further respectfully submits that Low's "anonymous" transaction system fails to disclose the "zero-based" verification system as claimed. More specifically, Low is directed to providing anonymous transactions, in which a bank that has issued the credit card (i.e., credit card issuer) is prevented from learning the "subject matter" of the credit card transaction, i.e., what goods or services were purchased by the credit card holder (See Low Abstract, lines 1-3; Col. 8, lines 48-53). As identified in Low's prior art section, the anonymity of the transaction prevents the credit card issuer from compiling information about the credit card holder's purchasing habits (See Low Col. 1, lines 16-23 and 60-65). In order to facilitate the "anonymous" transactions, Low requires an intermediate communication exchange (See Low Col. 3, lines 47-49), through which all communications pass, and which can read encrypted messages and pass only the required information along to the appropriate parties. It should be noted that the communications between the parties in Low are encrypted via public key encryption and signatures (See Low Col. 2, line 55 – Col. 3, line 6; and Col. 3, line 49 – 65).

To the contrary of Low's anonymous transaction system, which is based on communication exchange, encryption and signatures, the zero-based verification system of the present invention is an interactive proof system that is based on a challenge-and-response type protocol in which a prover (i.e., card holder) persuades a verifier (i.e., business) without giving any information regarding verification. At the end of the protocol, the verifier determines whether to accept or reject the verification based answers of the prover to the questions of the verifier. As a result of utilizing the zero-knowledge verification system, it is not necessary to use a communication exchange, public key encryption or signatures, and the like, in order to prevent another party from learning the card holder's personal information, i.e., card holder's identity or credit card number.

Applicant still further respectfully submits that Low does not disclose a sales transaction in which the cardholder presents coded information of the credit card to the business without presenting personal information of the card holder, i.e., the identity of the card holder or the credit card number. More specifically, the present invention is directed "zero-based" verification system that prevents leaks of "personal" information, such as card holder's identity or the credit card number, so that a business cannot identify the card holder or obtain the credit card number for illegal purposes (See present specification page 8, line 18 – page 9, line 2). That is, by utilizing a zero-knowledge verification system, the present invention allows the card holder to receive goods or services from the business without presenting personal information, such as card holder's identity or credit card number, for verification purposes. Thus, no personal information is disclosed to the business, because a feature of the zero-knowledge verification device is that it can verify a credit card via its challenge-and response type protocol without presenting personal information to another party, i.e., the business.

To the contrary of the present invention, Low transfers the account number (specification of the account B_p) from the credit card purchase device to the communication exchange, and this information is further transferred from the communication exchange to the bank B_p (See Low, Col. 3, line 62 – Col. 4, line 6; and Fig. 2). Thus, in Low it would be possible for someone with access to the encryption key to learn the account number (i.e., credit card number) for the customer P. In contrast,

according to the present invention, as explained in detail on page 6, lines 3-11 of the present specification, the zero-knowledge verification device verifies the card holder's credit card without presenting any personal information (such as the credit card number) of the card holder to another party. Consequently, even if *arguendo* the information exchanged between the cardholder and business is intercepted, this intercepting party would still not be able to learn the personal information, i.e., the card holder's identity or credit card number, because this personal information is not presented to the business.

Consequently, Applicant respectfully submits that Low's "anonymous" transaction system does not disclose the claimed sales system comprising credit card verification device based on a "zero-based" verification system, as is required pursuant to 35 U.S.C. 102(b).

In view of the foregoing, Applicant respectfully requests the Examiner to withdraw the rejections of independent Claims 1, 4 and 8 pursuant to 35 U.S.C. §102(b). Furthermore, Applicant respectfully requests the Examiner to withdraw rejections of dependent Claims 2-3 and 5-7, based on their respective dependencies from independent Claim 1 and 4.

Insofar as rejections pursuant to 35 U.S.C. §103(a) are concerned, the Federal Circuit in In re Fritch, 972 F.2d 1260, 1266 (Fed. Cir. 1992) has annunciated that "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification" (emphasis added). Furthermore, the annunciated principle requires that the prior art suggest modifying the teachings of the references so as to produce the claimed invention. Id. At the time the invention is made, there must be reason apparent to a skilled artisan for applying the teachings of the reference or else the use of such teachings will be improper hindsight. In re Novima, 184 USPQ 607 (C.C.P.A. 1975). Additionally, the Examiner cannot establish obviousness by locating references which describe various aspects of an invention without also providing evidence of the motivating force which would impel the skilled artisan to do what the applicant has done. Ex Parte Levengood, 28 USPQ 2d 1330, 1302 (Bd. Pt. App. & Int'f. 1993).

In traversing the rejections of Claims 1-8, pursuant to 35 U.S.C. §103(a), Applicant respectfully submits the arguable Low-Goldwasser combination is defective in that it fails to teach or suggest the claimed invention. More particularly, Applicant respectfully submits that the modification of any of Low's elements with a zero-knowledge system of Goldwasser would not result in the claimed invention. In the Official Action, on page 2, line 30 – page 3, line 3, the Examiner appears to have equated Low's credit card purchase device (See Low Col. 4, lines 2-6) with the zero knowledge verification unit of the present invention. Applicant first respectfully submits that neither of the references provides motivation to combine Low and Goldwasser. More particularly, notwithstanding the fact that Goldwasser discloses that its teachings may be used with credit cards (See Goldwasser Col. 1, lines 51-52), Applicant respectfully submits that neither Goldwasser nor Low provides any motivation to modify or substitute Low's credit card purchase device with Goldwasser's zero-knowledge system. Furthermore, Applicant respectfully submits that even if *arguendo* one skilled in the art were to modify or substitute Low's credit card purchase device with Goldwasser's zero-knowledge system, the skilled artisan would not be able to create the claimed invention because the customer (i.e., card holder) would still necessarily be required to maintain two accounts and initiate the transaction by contacting the bank, it would still be required to obtain approval of the transaction from the bank before the customer could receive the goods or services from the business, and the communication exchange would still be required to direct the communication among the several parties. Consequently, Applicant respectfully submits that the Low-Goldwasser combination fails to teach or suggest the invention as claimed.

In view of the foregoing, Applicant respectfully requests the Examiner to withdraw the rejections of independent Claims 1, 4 and 8 pursuant to 35 U.S.C. §103(a). Furthermore, Applicant respectfully requests the Examiner to withdraw rejections of dependent Claims 2-3 and 5-7, based on their respective dependencies from independent Claim 1 and 4.

Attached hereto is a marked-up version of changes made to the claims by the present Amendment, which is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

In view of the foregoing, Applicant believes that the above-identified application is in condition for allowance and henceforth respectfully solicits the allowance of the application. If the Examiner believes a telephone conference might expedite the allowance of this application, Applicant respectfully requests that the Examiner call the undersigned, Applicant's attorney, at the following telephone number: (516) 742-4343.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1, 3, 4 and 8 have been amended as follows:

1. (Amended) A sales system using a credit card [in which a card holder presents said credit card to a business that sells goods or services, said business, after confirming the validity of said credit card, supplies the goods or services to said card holder], said sales system comprising:

a credit card containing coded information unique to said card holder;

[and]

a credit card verification device possessed by said business, said credit card verification device comprising a zero-knowledge verification unit based on a zero-knowledge verification system [and being capable of] for verifying said credit card containing coded information based on the zero-knowledge verification system [whereby]; and

a sales transaction in which said cardholder presents [in said sales system using] said coded information of said credit card to said business without presenting personal information of said card holder to said business and said business after verifying said credit card using said credit card verification device [is carried out without presenting said personal information of said card holder to said business] supplies goods or services to said card holder.

3. (Amended) A sales system using a credit card according to claim 1, [wherein said credit card verification device is possessed by a card company verifying said credit card] further comprising a credit card verification device possessed by a card company verifying said credit card, said credit card verification device comprising a zero-knowledge verification unit based on a zero-knowledge verification system and being capable of verifying said credit card containing coded information based on the zero-knowledge verification system.

4. (Amended) A credit card verification device, said verification device comprising:

a zero-knowledge verification unit based on a zero-knowledge verification system [capable of] for verifying a credit card containing coded information unique to a card holder that is presented to a business for a sales transaction without the card holder presenting personal information to said business, wherein after verification said business supplies goods or services to said cardholder], wherein said zero-knowledge verification unit is based on a zero knowledge verification system and verifies said credit card without presenting personal information of said card holder to a business that sells goods or services].

8. (Amended) A credit card, said credit card comprising:

coded information unique to a card holder[, wherein said coded information may be] presented to a business for a sales transaction without presenting personal information of said card holder to the business, said coded information decoded by a credit card verification device comprising a zero-knowledge verification unit based on a zero-knowledge verification system[, whereby a transaction using said credit card is carried out without presenting personal information of a card holder to a business that sells goods or service] possessed by said business and said goods or services supplied by said business to said card holder.